THE CHEMIST

JULY 1949 VOLUME XXVI No. 7

DR. WALTER J. MURPHY, F.A.I.C.

The Chemist who Became a Great Editor

(*See page* 250)

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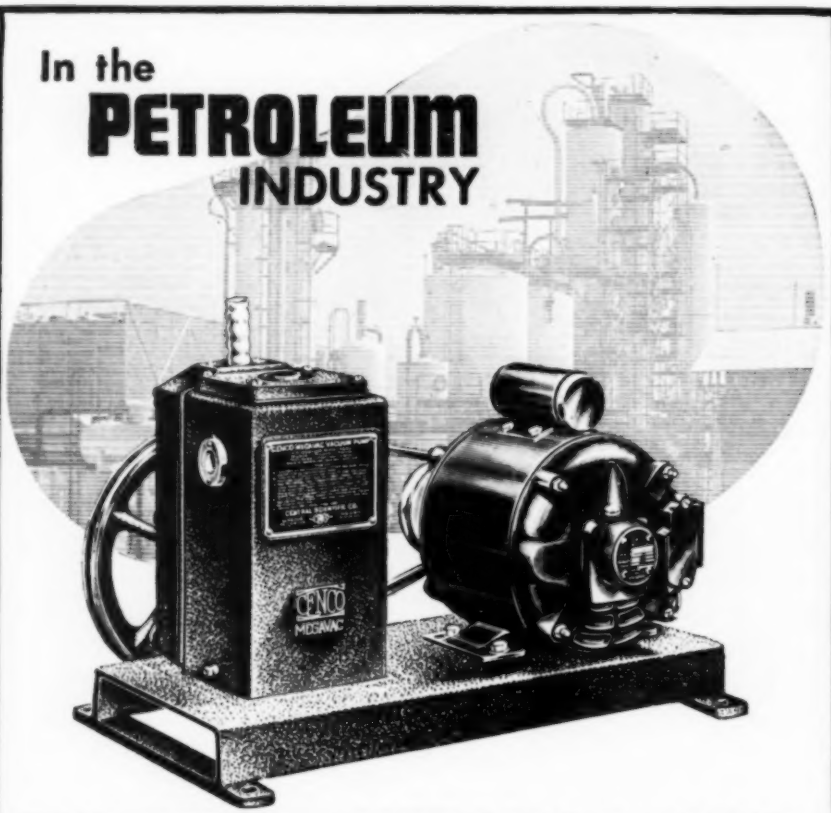

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SCHEDULED FOR EARLY ISSUES

Extension of Chemistry into Non-Chemical Industries (Annual Meeting Paper), by Earl P. Stevenson and Raymond Stevens, F.A.I.C.
Governmental Impingements Upon Industrial Research (Annual Meeting Paper), by John W. Anderson.
The Role of Universities and Industry-Financed Research (Annual Meeting Paper), by Dean Ovid W. Eshbach.
The Chemists' Economic Status (Annual Meeting Paper), by Dr. Louis Koenig, F.A.I.C.
The Role of the A.I.C. in Educating Chemists, by Dr. Gustav Egloff, Hon. A.I.C.
Manpower and Industry, by H. B. De Vinny.
How Can A Chemist Increase His Value? by C. P. Neidig, F.A.I.C.
Best Foot Forward, by Luella Cantebury
How Good an Employer Is Your Company? by Howard Nechamkin, M.A.I.C.
Industry Looks to Education, by Dr. Frank M. Surface.
How the Chemist is Chosen for Employment, by John C. Holle.
Other Material.

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COVER PICTURE

Dr. Walter J. Murphy, F.A.I.C., editor of the world's great technical publications, *Industrial and Engineering Chemistry, Chemical and Engineering News,* and *Analytical Chemistry,* was honored when, for the third successive year, one of these publications received the top award for editorial achievement in the Annual Contest conducted by *Industrial Marketing* of Chicago

This year's award was made, specifically for the most graphic presentation, to *Industrial and Engineering Chemistry* for its series of articles in the June 1948 issue, entitled, "Chemical Facts and Figures for the Chemical Process Industries." James M. Crowe, executive editor, personally supervised the issue. In addition to superb make-up and lay-out, the articles carried such a wealth of information that they have been in great demand as a reference source for facts about the chemical industry.

In 1948, *Industrial Marketing* also awarded first prize to *Industrial and Engineering Chemistry* for its issue on "Industrial Wastes."

The award for 1947 was given to *Chemical and Engineering News* for its series of articles on "Atomic Energy."

Dr. Murphy, formerly chemist for several firms including Air Reduction Company, American Cyanamid Company, and Mutual Chemical Company of America, entered the editorial field in 1930 as managing editor of *Chemical Markets,* followed by the editorship of *Chemical Industries.* He assumed his present position in February, 1943, when he succeeded the late Harrison E. Howe as editor of the three American Chemical Society journals. He is also director of the American Chemical Society News Service. Dr. Murphy merits the highest praise for the phenomenal growth of the journals and the high standards of technical excellence which distinguish them.

EDITORIAL

Success, Security and Seers

Dr. D. B. Keyes, F.A.I.C.

A.I.C. Councilor-at-Large

(One of a series of editorials being prepared by members of the Council of THE AMERICAN INSTITUTE OF CHEMISTS.)

MANY of my friends are real successes and all are seers.

They have told you most emphatically how to become a success, and they have done it in detail. They have said little or nothing about security— perhaps because they have been so busy attaining success and enjoying their work, they have had little or no time to consider the subject.

Incidentally, these friends of mine, these successes, these seers, give me advice only in public and in a ribald manner. With you younger men they are kind, considerate, and thoughtful. It is apparently too late to change me, but they still have hopes for you and your future.

You all know what they tell you: you must be a paragon of virtue to succeed. Were they? They were not!

Did they have a vast background of knowledge of chemistry and related subjects? They did not, but, believe me, they made use of every bit of knowledge they did have and they never have stopped learning.

Were they personality boys? Were they kind and considerate to everyone? They were not! But they were, and still are, mighty interesting people, largely because they were, and still are, intensely interested in their job.

Were they fluent? Could they talk and write well? No.! Some of them today, thirty years later, have real difficulty explaining their ideas, but does this fact stop them from talking and writing? It does not. If they are inclined to be inarticulate, their intense enthusiasm forces them to talk and write more than their fellows.

I wish I could say that these successes are at long last secure, but I cannot.

The only acquaintance of my youth who acquired security has a contract with the State to feed, clothe and house him for the rest of his life. The price he paid for this security was very high.

In the "Bright New World" we all talk security, but work busily to destroy the little we have. The "something for nothing boys" are busily taking over and creating a new philosophy. The parade has started, and we are gaily marching to the future

bread lines while the bands play "God Save us from Ourselves."

As my friends, the seers, have told you, "Retain your health and sense of humor, do the job you really enjoy, and it is at least theoretically possible that you may live long and prosper."

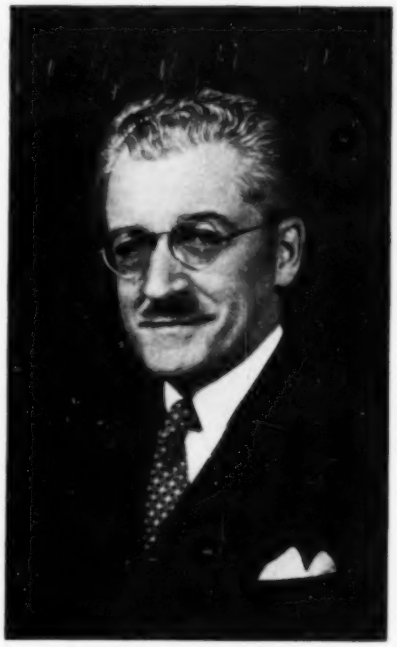
Fellowship Available

The Chicago Paint and Varnish Production Club and the Chicago Paint and Lacquer Association will award a fellowship leading to the M.S. degree in Chemical engineering at Illinois Institute of Technology for the academic year 1949-50. Applications should be sent to William A. Lewis, Dean of the Graduate School, Illinois Institute of Technology, Chicago 16, Illinois.

Steinberg Elected Treasurer

Ralph H. Steinberg, F.A.I.C., has been elected treasurer of the newly formed Optical Society of Chicago. The purpose of the organization is to disseminate knowledge in the field of optics for the benefit of the designers, manufacturers and users of optical equipment.

The A.I.C. Directory is being prepared. Have you sent in the Directory card?



—Washington Press Photo Service

Dr. C. C. Concannon Elected A.I.C. Councilor

I.C.U.M.S.A. Elects

The U.S. National Committee of the International Commission for Uniform Methods of Sugar Analysis announces the election of the following new officers: P. W. Alston, chairman; A. L. Holven, vice chairman, and C. F. Snyder, secretary-treasurer. Dr. F. W. Zerban, F.A.I.C., who presided at the Committee's annual meeting, May 16th and 17th, states that a report of the meeting, including, recommendations, will soon be distributed to member organizations.

How Germany Did It

Professor Roger Adams, F.A.I.C.

Head, Department of Chemistry, University of Illinois.

(A revised recording of a paper presented before the A.I.C. Annual Meeting, Chicago, Illinois, May 7, 1949.)

IN speaking on "How Germany Did It," i.e. how the Germans were able to attain such pre-eminence in fundamental research as compared with other countries, I am giving you opinions derived from my own general experience. I realize that each of you may have a different explanation for the German achievements during the period from 1880 to 1930. During those years, Germany was the leader in the basic sciences, especially in chemistry, and certainly during one or two decades accomplished more in chemistry of a fundamental character than any other nation and possibly than all other nations together. After receiving the doctor's degree in this country I went to Germany as a student in 1912 and 1913, so that what I say is perhaps reminiscent of those days which represented the high point in German scientific investigations. Just before World War I, Germany had many professors who were geniuses in fundamental research and had unexcelled laboratories. Both men and facilities soon after were to be diverted to war demands.

How had Germany developed this outstanding scientific ability? In large measure, it was due to the calibre of professors who were so influential in the life of the state that they were respected by industry, government, and the public. It was conceded that German university scientists had stimulated in the early years the establishment of the chemical industry and had been of continuous aid to it ever since. Industrial corporations, appreciative of this cooperation, gave them liberal support in the form of gifts of chemicals in large quantities. Manufacturers of various types of laboratory equipment gave frequent donations. Not only by industry but by Government and the public were the scientists recognized. They were considered a vital factor in the progress of the German nation. Contributing to the ego of the professor or student was the fact that they had a social standing as exemplified by an identification card which permitted them certain privileges not accorded others.

Social Prestige

The professors were second only to the military and above the politicians in social prestige. An experience three

of us had on Unter den Linden is typical. We were a bit hilarious, having a good time, and were perhaps a little too noisy. A policeman approached and spoke to us. All we had to do was to show our cards in order to satisfy the policeman. He saluted and walked away. The difference in the prestige of the professor or student in Germany and in the United States was conspicuous.

Because of the support by industry and government of the various universities and of the Kaiser Wilhelm Institutes which were started about that time, excellent facilities were available for research. There were always plenty of glassblowers, dishwashers, analysts, and other technicians. What impressed me after having worked in this country merely with test tubes, beakers, and Claisen flasks, was that the Germans were meticulous in selecting the proper laboratory equipment to be used for any particular reaction. They would often design and have made special glass apparatus before starting an experiment. The professors in the universities or institutes at that time had essentially no administrative work. They were not hampered by committee work and the red tape common in most of the universities in the United States.

I worked under Professor Willstaetter at the Kaiser Wilhelm Institute in Dahlem. He had thirteen men. All had received their doctor's degrees. About half of them were foreigners. Many had been with him for several years. Dr. Arthur Stoll, an eminent scientist who is now president of the Sandoz Company in Basle, was Willstaetter's chief assistant and had been with him for seven years. Incidentally, Stoll is still publishing distinguished scientific work. One of the assistants was Zechmeister, who has been so influential in developing chromatography. (He is now at the California Institute of Technology.) Prof. Willstaetter studied in his excellent library until late every evening. He came to see his men twice a day, in the early morning and again about a quarter-of-six at night. His entire energy was devoted to study and thought and to the direction of his research men.

In the period from 1900 to 1914, chemistry and the chemical industry had so expanded in Germany that many students were attracted to the study of this subject. As a result, there were many more Ph.D. students than there were places open. When these trained men could not get jobs, they were willing to take post-Ph.D. assistantships at very low salaries under a distinguished professor. With the additional experience of two or three years they would be better qualified for an industrial position. Moreover, social prestige went with these assistantships. These conditions led to more effectively trained scientists for industry and especially to the accom-

plishment of scientific research of a very high order.

The Selection of Professors

The general university setup in Germany is quite different from ours. There is just one professor in each institution in any one field. Anyone else who is on the teaching staff at that particular institution is an assistant at very low pay or a "privatdozent" with no pay except for part of the fees of students who might be taking the lectures offered by him. The professor, however, received an excellent salary and in addition part of the fees of students attending his lectures. Emil Fischer, at the University of Berlin when I was there, was reputed to have an income of 100,000 marks a year. His salary was said to be 40,000 marks. A hundred-thousand marks in those days was a very large salary because the mark, worth officially twenty-five cents, had the purchasing power in Germany about the same as a dollar here.

The selection of professors in Germany deserves comment. A man who received his doctor's degree and desired to go into university work had to complete another independent thesis. On the basis of this accomplishment he would be considered for a "privatdozent" or instructorship at no pay. A brilliant scientist with originality and skillful technic might complete such a thesis in one or two years. The less capable man sometimes required four, five, six, or even seven years before his independent work was in finished form and he would be considered for a position. The saying was common, especially among the students, that if a man wanted to go into university work he must marry a girl who had adequate means to support him until the time when he could attain a professorship. It was difficult enough to become a privatdozent, but even then, if he had no outside income, he had to rely for a living on income from student fees or from consulting work with an industry. If very able, the privatdozent had students taking theses work with him for the Ph.D. degree. When finally he had demonstrated unusual ability and then there was a vacancy either in the same institution or in another, he was considered for a professorship. The advice of prominent scientists in different parts of Germany was sought in order to find the best possible candidate for an opening. The experience of Willstaetter is worth noting. He received the doctor's degree when he was very young, twenty-one years old, if I recall correctly. Within the next two years he had completed a brilliant investigation and became a privatdozent. This work and what he did immediately thereafter attracted much attention, because of the ingenuity and cleverness with which he solved various important and difficult problems. Students wanted to work with him. He was very energetic and before he

was thirty, he had an international reputation and was selected for a professorship. This one case illustrates how rapidly a brilliant man, a genius, could advance in Germany in spite of the relatively few positions. But most privatdozenten did not attain success so rapidly. Many worked until they were thirty-five, forty or even forty-five before they received professorships. Others were never appointed to such positions. Some men who could have qualified at thirty for the best senior positions in this country were middle-aged before receiving professorship appointments in Germany. These comments demonstrate the careful screening system in the selection of professors. Only the geniuses or very talented reached the sought-for goal. It is significant, however, that the goal was well-worth the effort and the incentives were great, for as a professor a man reached a high political, social, and financial level.

Professional Characteristics

Now just a word or two about the characteristics of such men as Willstaetter or Emil Fischer. They were exceedingly hard workers. They worked all the time. They were very ambitious. They had a great love for the science. They did relatively few things socially. Once in a while, they would invite students to their homes for a few drinks and informal discussion. They had extraordinary memories with a tremendous fund of coordinated information in their minds for use in whatever problems they were attacking. I have occasionally heard it said, "discourage a student from memorizing; just advise him to learn principles." Principles are important, but unless a multitude of facts are available in a scientist's mind, he usually will not be original or a creator of new principles. Every man that I know in this country or abroad who is really talented or a genius is one who has a prodigious memory; who has available a storehouse of facts which he can use in original work, in the creation of new ideas and new theories.

This system of training and selecting brilliant men as professors in Germany, the abundance of post-Ph.D. assistants available to them to help in the solution of difficult problems and the prestige of a professor in the eyes of the public-at-large had much to do with the success of German science and scientists.

The United States System

Why has the United States, a much larger country, not produced as many geniuses in science as Germany? A few facts about chemistry professors and chemical industry are pertinent. I happened to be trained as a graduate student, 1909-1912, at a time when the chemical industry in the United States was almost exclusively in the manufacture of heavy chemicals. There was essentially no fine chemical industry. The organic chem-

ical industry actually got under way during the first World War. In order to get chemists for their laboratories and to direct research, industry raided the universities from 1915-1920 and picked up all the professors or instructors that they could, at salaries double or more what they were receiving in university work. The raiding was so efficient that the men in my generation in university work in this country at present are very few in number. With few exceptions, the men whose names are known best in university work in this country received their degrees after the close of or many years prior to the first World War. For fifteen years until about 1930, the American chemical industry was engaged in finding how to manufacture chemicals which had previously been imported from Germany. Significant contributions, however, were made in the application of chemical engineering to production processes.

The course of fundamental research in the United States is interesting. The number of professors in the United States who had international reputations during the period 1870-1910 were very few. We had such men as T. W. Richards in atomic weight work, Neff at the University of Chicago was a distinguished man, who incidentally rarely published in American journals. He preferred the German journals which were more widely read. Arthur Michael was another man who also published abroad. Willstaetter in 1912 commented to me that the significant scientific literature in organic chemistry from the United States was so meagre that he merely used one evening a year to scan it over.

Why had we so few prominent professors? I believe it is due in part to the system for selecting professors in the United States. A student completes his work for the Ph.D. degree. The man's ability as a student is used as a basis for his recommendation to an instructorship in some university. At this stage of his development in chemistry, it is with very rare exceptions impossible to determine whether he has the combination of judgment in selection of problems, independent originality and creative ability which will result in his becoming an outstanding scholar. If a new instructor is able to teach satisfactorily, if he performs his additional menial duties which in many universities are expected of him, and if he does some research, he generally is retained and eventually becomes a professor. During the first ten years of service, when he is mentally and physically the most vigorous, he is in most institutions burdened with duties which absorb a large proportion of his energy. This often leads to the discouragement of an instructor toward scholarly work unless he is extremely able and ambitious. So many university positions are filled by men of average ability that there is not

always a vacancy available when a young Ph.D. of unusual promise may desire to enter university work. In many institutions, younger instructors are not permitted to direct student thesis work until they have demonstrated their ability to do independent research work. Lack of assistants during the years which should be most productive are a real handicap.

The students who study for the Ph.D. in the United States have a spoonfed training. In most universities they have certain assigned courses or examinations in certain fields which they must pass creditably. Beyond this assigned work, independent reading and study is uncommon among the students. Usually, a minimum required residence time for the Ph.D. degree is established. When a student has spent his three years, he is often given a degree on the basis of a thesis of poor quality in which adequate positive results are frequently lacking. There appears to be an assumed obligation on the part of the professor to see that any reasonably competent student obtain a degree. Contrast this situation to that of his fellow student in Germany. There the student may or may not attend lectures as he pleases. He is not required to take examinations. When he has completed a satisfactory thesis for which a short or long time may be required with no assumed obligation on the part of the professor, he takes a final oral examination in which the breadth of his knowledge is tested. Many fall by the wayside in this European system, but the ablest of those who graduate and have a broad knowledge of chemistry, for the most part self-acquired, are those who may be expected to excel in independent work in the future. The required "privatdozent" thesis screens these men even further before they may enter university work.

In Germany in former decades, it was not uncommon to have several professors under thirty years of age who had international reputations. The number of chemists in the United States who have had, or have, even national reputations in scholarly work at thirty-five or forty years of age is small indeed.

Encourage the Talented

I am convinced that a man cannot acquire by study the ability to be a genius or to be very talented. This is an innate trait which is greatly developed by proper training. What we lack in the United States is a system by which the very talented can be found and then given the opportunity for rapid progress as compared with the great mass of other students who continue to the Ph.D. degree. Our system of training is superior for those who intend to take the run of positions in industrial research laboratories. I would of choice pick today an average American for such a job in preference to an average Euro-

pean, since I believe the American will be better trained and more suitable for the work assigned him.

At present, most of the research laboratories in the universities in this country have adequate supplies of chemicals and equipment so that almost any type of research may be accomplished. The results from these laboratories depend in large measure on the quality of the professors who direct the research. Such men fall into several categories. There are those who are rich in good ideas and thoroughly familiar with what is going on but who do not have the patience to carry a problem through to completion in the laboratory. There are others who cannot see the important things to be done and select relatively inconsequential problems for study but are skillful and original in working them out experimentally. The professor in the third category who can see the important problems to be solved and who at the same time is never discouraged, and persists until each is solved in the laboratory, falls into that rare class of geniuses or very talented of whom we have so relatively few in the United States.

With the present system, I cannot foresee much change in this country. In the future, I anticipate as much or more scholarly work from our laboratories than in the past on the basis of larger chemistry staffs and the increased number of graduate students. In 1934, as president-elect of the American Chemical Society, I predicted that the unemployed chemists at that time, and there were many of them, would, if properly trained, have jobs within a year or two. Fan letters from the unemployed condemning my attitude and my ignorance of the situation were received, mostly, however, from those who called themselves chemists but who were not justified in being called so by their training. Within a couple of years those chemists were hired and ever since there has been relatively little difficulty in placing well-trained men.

A Prediction

I am now predicting again. Since World War II, there has been a fifty per cent increase of Ph.D.'s graduating from our larger institutions. I estimate that the research facilities in this country have not increased more than ten to fifteen per cent since 1941. If this is correct, then within the next two or three years we will have supplied the demand for chemists necessary to fill these laboratories. Thereafter, the supply will more than take care of normal replacements and positions will be harder to find. We may then anticipate more students who desire to take post-Ph.D. training in order to aid them in getting jobs. These conditions will automatically increase the fundamental science output of our universities and at the same time tend gradually to discour-

age the less talented student from studying chemistry. The quality of chemists should therefore improve in the next ten years, if my prediction comes true. Right now, the average graduate student is not of prewar quality. Far too many of them are in chemistry not because of a love for the science but because of the prospect of well-paying jobs they may eventually get. Security and New Deal and Labor Union ideas of a short work week, with as little work as possible is prevalent and has infected even scientists. Only a few students have the drive, interest, ambition and proper outlook found in many of those trained before the War. The most successful scientist is the man with self-confidence and enthusiasm who follows chemistry because he would rather do it than anything else, and who gets more enjoyment out of a successful reaction than going to a movie or to a baseball game.

I have compared briefly the training of chemistry students in the United States and in Germany and the way in which our embryo professors are selected. Even with the disadvantages of the present system, university positions in the United States would attract more well-balanced, capable men, if, when the professorship rank was reached, there was more prestige in the position and more adequate financial return. The social standing nationally of a professor is not high and the average citizen still looks upon him as one who lacks the ability to earn a living in any other way. I see no immediate possibility of raising the social, political, and professional standing of the professor.

Education in the United States is levelled for the average student. No means is available for selection of the very talented and offering them special opportunity. We need a system first for screening our scientists and second for giving to those who show a germ of genius, facilities and conditions for self-development. I believe with effort this goal could be attained. If we had a reservoir of such talented individuals from which to appoint instructors and professors, the quality and quantity of our future fundamental research would be materially improved.

Glycerin Sections of Beilstein Translated

The Glycerine Producers' Association announces that the sections on glycerine and some glycerine derivatives from Beilstein's *Handbuch der Organischen Chemie,* 4th edition, have been translated. The translation is available at $2.50 per copy from the offices of the Glycerine Producers' Association, 295 Madison Avenue, New York 17, N.Y.

The Chemist His Own Employer

Dr. Otto Eisenschiml, F.A.I.C.

President, Scientific Oil Compounding Company, Chicago, Ill.

(Excerpts from a talk given at the Annual Meeting A.I.C., Chicago, Illinois, May 7, 1949.)

FIRST of all, let me state that I am all for the chemist who wants to be his own employer; it is a legitimate goal for anyone's ambition. That the number of chemists who strive for it is comparatively small may well be due, at least in part and by indirection, to those who implant the idea in the student's mind that upon graduation, and for the rest of his life, he is going to be an employee of the chemical industry, not a part of the industry itself.

In discussing economic independence, I shall confine my remarks to chemical manufacturing, for it is a field which I know as one in which chemists can use their training to good advantage, and where they will find an opportunity to start on a modest scale; they also will find enough pitfalls to make the road to success interestingly hazardous.

What are the foundations on which a small chemical manufacturing enterprise should be built?

Business, you will discover, is nothing but applied common sense; if you have little of that, don't get started at all. Being a good chemist is only a small portion of your necessary equipment; a thorough grasp of financing, selling, managing, credits, and other branches of business are equally essential. Wherever you cannot function properly, someone else must fill in; for if your organization is weak in one essential, the entire chain will break, and you will find yourself in serious difficulties.

Good businessmen are not made in schools. Hence, I consider the taking of business courses a waste of time. If you wish to be informed on business fundamentals, books will do just as well. The bulk of your knowledge, however, must come through experience, and there is no detour leading around it. In saying this, I still maintain that no amount of mere knowledge will make a good businessman. The only things which can do that are common sense, quick thinking, sound judgment, the ability to lead

men, and many other qualities which cannot be learned from books or in schools.

A chemist starting in business for himself

> should have seen no less than five years of service in chemical establishments;
> should be well versed in at least one line;
> should have a definite plan of what to manufacture;
> should have surveyed the market for his products and their future prospects;
> must know their costs and competitive conditions.

Most business failures are due to a disregard of the following rules:

1. *Provide yourself with sufficient financing.*

It has been demonstrated that *net working* capital (capital exclusive of fixed assets) can at the very best be turned over four times a year. If your working capital be $25,000, do not therefore figure on doing more than $100,000 worth of business annually. If your profit be 10 per cent net, your income will be $10,000. Do not count on increasing your net working capital by commercial credits or bank loans; they are rarely extended to a new venture. Even if they are, they are subject to sudden withdrawals, which would leave you in a very uncomfortable, perhaps in a perilous position.

2. *Do not invest heavily in fixed assets.*

You need not own your place of business; in fact, it is inadvisable to own it at the start, for its location may prove faulty, and you cannot foretell the rate of your expansion. Buy your machinery in the second-hand market whenever possible.

Do not make your plant or office a showplace. Such a display will fool no one. What counts is your balance sheet, especially the proportion of *liquid* assets (cash, inventory and bills receivable) to liabilities. Fixed assets are mere trash in the eyes of creditors and bankers.

3. *Keep your overhead expenses low.*

Low overhead expenses are more desirable than a galaxy of high-priced employees, and will inspire confidence among those who count.

4. *Do not start your enterprise as a partnership.*

The majority of chemists I have known to go into business took in a salesman as a partner, in the mistaken belief that they themselves could not hope to sell their products. I have seen many of these partnerships dissolved after a short time. The salesman, having learned something about manufacturing, will break away, hire a chemist to carry on the inside work, and leave his partner to shift for himself. Too late the chemist finds out that selling products one knows does not call for a special kind of genius, but is a matter of clear and

honest presentation, supported by competitive prices.

There are other arguments against a partnership. A partnership is worse than a marriage. You can divorce a wife, but to sever relations with a partner is an intricate process, and may not be possible at all. One can quit a position, one can fire an employee, but an incompatible or incompetent partner can hang on like a bad cold and make your life miserable.

5. *Do not put all your eggs into one basket.*

In other words, do not concentrate either on one product, or on one outlet for the major portion of your output. A change in markets, or a new and better product, may hurt you in the first instance, a change in purchasing policy by your pet account in the other. It is well enough to begin your business by leaning heavily on one customer, but diversify as quickly as possible so as to gain elbow room.

6. *Do not try to become an expert in everything.*

The various departments of your business, such as shipping, bookkeeping, credits, taxes or commercial law, are worthy of a speaking acquaintance, enough to allow you to check the work of your staff. For the finer points depend on the advice of specialists in their respective lines.

7. *A small concern has its best chance for initial success by starting on specialties.*

The volume in specialties may not be large, but the profits are, and you will be working in a field which the large companies may not care to enter. Specialties alone, however, are seldom profitable in the long run. Let other, less profitable lines, help carry the load. Remember that a proper mixture of cream and skim milk makes an appetizing dish, on the table as well as on your sales list.

8. *Do not start without financial reserves.*

The first few months of a new business usually cut into your capital. Be prepared for this setback, and do not let your spirits droop on account of it. If, however, your business shows no profit after six months, consider it a warning sign, and unearth the cause of the deficit. Always take monthly inventories. If you do, faults cannot grow to dangerous proportions, and you will retain a clear over-all picture of your operations.

All this may sound terribly complicated, but so do the rules of baseball to the uninitiated. Look at the successful businessmen you know, and you find that few of them are geniuses. On the other hand, each one has probably some peculiar qualities which distinguish him; it may be his perseverance, or his quick thinking or his faculty to inspire confidence, or almost anything else.

In what qualities do you excel?

Whatever they are, play them to the limit.

At the conclusion I venture to make one prediction: If we had more chemically trained businessmen, not only the chemists, but business itself would be the better for it.

Right: **Dr. E. H. Northey, F.A.I.C., chairman of afternoon session, A.I.C. Annual Meeting, May 7th.**

Below: **Dr. Roger Adams, F.A.I.C.** ***(see page 253)*****; Dr. M. L. Crossley, A.I.C.; President L. H. Flett; Dr. Gustav Egloff, Hon. A.I.C., chairman morning session, A.I.C. Annual Meeting, May 7th; and Dr. Vanderveer Voorhees, F.A.I.C., Chairman, Annual Meeting Arrangements.**

—E. L. Gordy, F.A.I.C.

Government Financed Basic Research

(A Condensation)

Dr. C. C. Furnas

Director, Cornell Aeronautical Laboratory, Inc., Buffalo, New York

(Presented at the A.I.C. Annual Meeting, Chicago, Illinois, May 7, 1949.)

COMPARED with the rest of the world, America's accomplishments during the last two generations in the development of new products has been phenomenal. As against this, however, our performance over the same period in contributing to the fund of new knowledge through basic research has been definitely second-rate as compared to Western Europe. There is now a general realization that our past deficiencies in basic research must be remedied if we are to maintain the position into which we seem to have been thrust—the dominant country in the economic and political world pattern.

The most comprehensive and probably the most valid survey of the problem with suggested methods of solution was compiled by the President's Scientific Research Board and presented in the five volumes of the so-called Steelman Report.[1] It summarizes the general research and development experience of the country in the year 1947 and makes recommendations for a ten-year program which is considered to be optimum for the continuing national activities in research and development.

The expenditures on research and development throughout the country in 1947, exclusive of work on atomic energy, are given in Table I:

TABLE I.

The National Research and Development Budget 1947
(excluding atomic energy)
(In millions)

Agency	*Total*	*Expenditures in 1947* *Basic Research*	*Applied Research and Development*
Total	$1,160	$110	$1,050
Federal Government	625	55	570
War and Navy Departments	500	35	465
Other Departments	125	20	105
Industry	450	10	440
University	45	35	10
Other	40	10	30

DISTRIBUTION OF FEDERAL FUNDS

	Total	*War and Navy*	*Other*
Total	$625	$500	$125
Government Laboratories	200	100	100
Industrial and University Laboratories on contracts ...	425	400	25

Reference 1, V. I, P. 12.

The important features of these data are that in that year something over $1,100,000,000 was spent on research and development by the federal government, industry, universities and research foundations. This amounted to approximately ½% of the gross national income. About 10% of this effort went for what could be roughly classified as basic research.

The report strongly recommends that by the year 1957 the nation, as a whole, should approximately double this research and development effort. This would mean an expenditure of approximately $2,200,000,000 per year or roughly 1% of the gross national income. It further recommends that there be some drastic shifts in the distribution of effort as follows:

1. At least four times as much as at present be spent on basic research.
2. At least three times as much as at present on research in health and medicine.
3. At least twice as much as at present on non-military development.

The breakdown of the recommended figures are given in Table II:

TABLE II.

National Research and Development Budget for 1957.
(In millions)

Type of Activity	*Amount*	*Proportion of Total Budget, %*
Basic Research	440	20
Health and Medical Research.....	300	14
Nonmilitary Development	1,000	44
Military Development	500	22
Total.....	2,240	

Reference 1, V. I, P. 28.

It was strongly recommended that a National Science Foundation within the Executive Office of the President be immediately established and authorized to spend $50,000,000 of national funds for basic research in its first year with increasing amounts thereafter, rising to an annual expen-

diture of at least $250,000,000 by 1957. It was recommended that a very substantial portion of these expenditures should be used to support work outside the federal establishment, that is, in universities, foundations and industries. However, there should also be an increase of the in-government research and development programs to at least twice the 1947 figure.

Evaluation of the Recommendation

In evaluating a program such as proposed by the Steelman Report, one necessarily has to rely on honest personal opinion. It is a problem of such broad scope and so many ramifications that it is not subject to exact analysis and it would be naive to suppose that unanimity of opinion can be achieved. I shall briefly present my own ideas of the merits and demerits of the various recommendations.

The first question that enters the mind, "Can this nation afford to spend 1% of its income (something over $2,000,000,000) per year on research and development?" To me the proper answer to that question is, "Can the nation afford not to spend that much?" For comparison it should be noted that the process industries in this country, which are the most research minded, and also the most prosperous, spend an average of 2% of their gross sales on research and development.[2] It is also interesting to note that those industries of the country which advanced and prospered moderately during the late depression were those which continued and even increased their research budgets. In general, the best way to assure national prosperity in the complicated modern world and to maintain national and international strength is to sustain a large and well administered research budget. The necessity for maximum research effort in national defense is obvious and well recognized.

Increasing not only the amount, but the proportion, to be expended on basic research makes a great deal of sense. I consider it essential if our national excellence is to be maintained. One could argue as to whether the amounts and proportions suggested are optimum, but my own reaction is that they are about right. I could not suggest any better figures.

The recommendation for the establishment of a National Science Foundation has been the subject of much argument and debate for three years. Disagreements on the executive structure and the basic patent provisions have led to much rancor and the use of many tons of paper. It is generally agreed that such a foundation is basically a sound idea, but no one has found a formula which satisfies everyone. It appears now, however, that a reasonable compromise may be approaching. The Foundation Bill, S.247 in the House of Representatives was referred to the

Committee on Interstate and Foreign Commerce on March 22, 1949. This particular bill was passed by the Senate March 18, 1949. The basic purpose of this Foundation will be ". . . to develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences." It essentially fulfills the recommendations of the Steelman Report, but does not cover any specific appropriations. The issue of patents is evaded to a considerable degree but at least it recognizes the equities of individuals or organizations as well as the public. My own principal objection to this bill is that the Foundation shall be made up of twenty-four non-paid members. Although such governmental boards and foundations of part-time, non-paid members work after a fashion, due to the loyalty and hard work of their members, the activity is still necessarily only a side issue in their existence. The bulk of the work is always left to a secretariat, which labors without authority, and decision and guidance on matters of paramount importance are usually arrived at by the parent, volunteer group without adequate consideration or full knowledge of the situation. I feel strongly that for such supervising and planning groups to be effective it is necessary that they be made up of full-time, well-paid professional employees who can devote all their efforts to these items of great national significance.

When it comes to the recommendation that the government approximately double the expenditure for in-government laboratories, I have a feeling of strong trepidation. It is my own opinion that, if the so-called American system has any strength and means anything, the government is already expending too much in its own research establishments. Government work necessarily leads to bureaucracy and the potential evils of bureaucracy are well known. Too often, the structure of civil service, i.e. government establishments, is that a few per cent of the loyal and capable people on top work themselves to death, in planning, supervising, fighting frustration, and battling red tape while the bulk of the lower-echelon employees just go along for the ride, with far more interest in complacency and security than in accomplishment.

Frequently there is no adequate yardstick to gage accomplishment; it is very difficult to discharge incompetents, and a multiplicity of rules and regulations engulfs all except the strongest characters with an atmosphere of frustration that is deleterious to the expenditure of best efforts. I speak from a considerable background of experience in these matters. Further, an overpowering proportion of direct governmental activity has a stongly enervating effect on

the initiative of private enterprises. "If some one else will solve all the problems, why should we worry." The Santa Claus complex easily becomes undesirably strong. There is also the perennial urge for self-perpetuation, on the part of any government agency, long after the original reason for existence has disappeared. This is very difficult to break, particularly when the yardstick is one of political expediency rather than of economic or scholarly excellence.

Despite all these deleterious potentialities of large governmental units, the Federal laboratories can, do, and must fulfill many vital functions. Some bureaus and branches, despite the handicaps, do a great deal of work of most vital significance. Most of this must continue, but major expansion of in-government research and development, should be viewed with a great deal of skepticism.

The principal function of the Foundation, as I see it, should be that of careful and professional planning of the national program with the bulk of the funds available being allocated to existing non-government institutions: universities, foundations and industry. In this use of funds for basic research, there needs to be a great deal of freedom from exacting direction and a relief from the great mass of irritating blocks of accounting and control. Federal money is usually encompassed with a tremendous maze of regulations designed to prevent misuse and fraud, with the threat of a Congressional investigation always hovering in the background. This may be a worthy objective from the public point of view but it has led to major and unnecessary irritations, frustrations, and inefficiency on the part of contractors who are honest, capable and hard working. Major steps should be undertaken to remedy this situation.

The Responsibilities of Industry

The planning and general direction of the Foundation should be from a recognition of the broad pattern of research and development and an appreciation of how the different parts of the pattern fit together, from the birth of an idea to a usable product or process. Basic research, applied research and development are mutually interdependent. But the integration and merging of the national efforts in these fields at the present time leaves much to be desired. The Foundation could render a major service in bridging the gaps. Since the American government is of, by and for the people, then government has a legitimate and important interest in seeing that efforts in these different categories are integrated and merged in a pattern which is in the greatest national interest. This can be done by top-level planning, education, general direction and financial support.

Not only for the welfare of the individual units, but also for the soundness of our national life, industry

should assume much larger responsibilities for basic research than it now has. It is almost certain that, if industry does not pick up this responsibility, the government will, so if there is merit in industry being self-supporting in this country, it is high time that it make a more complete and constructive effort in building up the background of basic scientific knowledge. Not only should industry make larger expenditures for basic research—it should also make every effort to publish the results of its findings and thus make the information available to other scientists and to the public. It is usually true that the revealing of fundamental scientific knowledge is mutually helpful to all concerned and does not spoil an industry's legitimate proprietary position. As Kettering once said, "If you close the laboratory door, you shut out much more than you keep in."

In general, my own evaluation of the national science program as recommended in the Steelman Report is that it is basically sound and necessary. There are various points which need to be improved to avoid the deleterious effects that often come with government activities that get out of balance. Along with the government stimulation and support, industry must take a more aggressive and constructive position in the field of basic research than it has in the past. Unless this occurs, a national science program at the worst will fail and at the best be only moderately successful.

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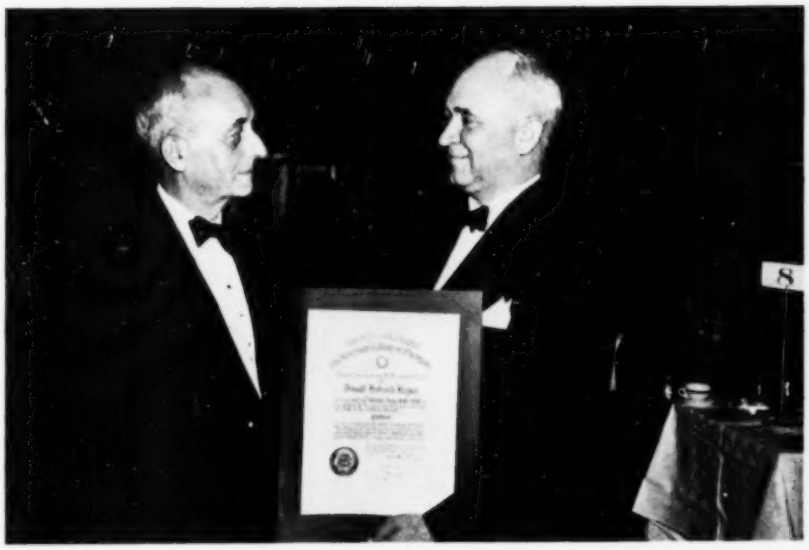

—*Chemical & Engineering News*

Dr. Keyes accepting the New York Chapter A.I.C. Honor Award from President Flett.

The Guest of Honor

Dr. M. C. Whitaker, F.A.I.C.

Consultant, American Cyanamid Company, New York, N.Y.

(Presented on the occasion of the New York Chapter, A.I.C. Honor Award to Dr. Donald B. Keyes, F.A.I.C., May 18, 1949.)

DR. DONALD Babcock Keyes is a native of Rhode Island. It became apparent, by the time he was two years old, that there was not room enough in that little State for a boy like Keyes. He finally burst out of Rhode Island and his first important stop was the University of New Hampshire.

Our distinguished friend and fellow worker in this profession, Charles L. Parsons, and faculty associates at the University, trained Keyes for four years, giving him the groundwork in science, especially in chemistry, which he has used to such good effect in building his successful career.

Our guest was finally released from New Hampshire and given a passport, in the form of a B.S. dip-

loma to travel as far as New York city. He used this document as a spring-board to get into the Graduate School at Columbia in the fall of 1913. It was there that I first met him—in fact everybody on the staff met him. He "ate up" the freedom of action a graduate student is given at Columbia. He was all over the place. Nobody seemed to know what courses he was taking or when he studied. He loved to ask questions, or break up a lecture by starting a discussion. It was often difficult to tell who was giving the lecture—the professor or Keyes.

Everybody liked Keyes. They knew he was an independent thinker, a leader rather than a follower, a keen analyst who could turn the spotlight on the core of a subject under discussion, a self-starter, and that, in spite of his New England origin, he was in reality one-hundred per cent Missourian and had to be shown.

Our Guest of Honor literally finished off Columbia in about a year, polished off New York city, and started due west, where he settled down for three years at Berkeley. Finally the University gave Keyes the doctor's degree and shoved him out into industry. He became interested in alcohol — not so much as a consumer of that commodity, which was still plentiful though outlawed—but as a field for research and development as a useful chemical.

Keyes' Research on Alcohol

Alcoholic beverages of various concentrations, and even 95 per cent alcohol, had been well known commodities for hundreds of years, but how about 100 per cent completely anhydrous alcohol? As a laboratory reagent it had been made by dehydrating with quicklime. The French government spent $400,000 after World War I in an attempt to make anhydrous alcohol by the lime method.

It was known to have many valuable properties not possessed by the natural 95 per cent product, e.g., it could be mixed in all proportions with gasoline to produce a good anti-knock motor fuel; it was a better solvent than the 95 per cent product, and so on.

The present availability in the United States and some foreign countries of completely dehydrated alcohol and similar solvents in tank car, or even in train load quantities, is a monument to Keyes and his co-workers. The azeotropic removal of the water of reaction in direct esterification processes, now in common use in laboratories and plant processes, is an equally important development of this program. Full details of all of this work have been published in patents and articles by Keyes and his associates, and are available to all young chemists and chemical engineers as outstanding examples of a right way to meet and conquer a

research, development, and engineering problem.

The Problems of a New Product

Research, development engineering, construction and initial operation of a new process, are very long drawn-out and expensive. In fact it costs so much, and takes so much time, that almost nobody can afford to do it with his own money, or with the savings of others. The only safe way to launch such a program is on the basis of diverting the constantly recurring earnings of other operations. In short, by getting yourself where you can lift yourself by your own bootstraps! Even this method will fail and drag all of the related personnel into disrepute unless we meet certain requirements. What are some of these requirements? Let us take a case:

A research chemist comes up with a new and potentially useful product. He make a few ounces and confirms its usefulness. He then announces that he has invented a valuable new product and a "process" to make it.

Now is time for one of the high-price overhead to take off his coat, put on his glasses, and take a good sharp look at this proposed "process." He may, and usually does, find that the research chemist has found a way to make the product, but has not yet invented a process by which it can be manufactured. If the overhead is tough enough and the research man is resourceful enough, they will pass the buck back and forth, until the chemist finally gets disgusted and comes up with a real process which is a knock-out.

Since research is the cheapest of the four steps in a program of development, and since a good sound process is the keystone to the arch of the whole development, this is the place to take the time and to spend the money required to invent a process which will stay invented. To have to re-search, re-pilot, re-engineer, reconstruct and re-pay for a plant once built on a poorly executed research program, is embarrassing, expensive, ruinous to some professional reputations, and can easily be a stepping stone for the sheriff to take over the whole enterprise.

Keyes Becomes Professor

After we have spent half a century in the chemical industry, we gradually get our mental ducks in a row. As chemists and engineers, we have to be optimists, but that does not mean that as researchers we should not look for and find trouble. We get so we can sort of smell a faker by the approach; we can spot a bluffer by ear; we can filter out another group who seem always to be identified with the most successful failures; finally we have left a promising residue. Here we find a group of technically qualified professionals, men with judgment, vision, mental honesty, an uncommon amount of common sense, and some suggestion of the divine spark. Our guest has al-

ways been classed in this latter group. As one of our colored boys once remarked to his fellow worker, when Keyes and one of his associates walked by while they were leaning on their shovels, "them is the things they make vice presidents out of."

One day our laboratory in Baltimore was invaded by a stranger. He got in by qualifying as the president of the University of Illinois. He had come all the way east to look for a chemical engineer, and in Keyes laboratory he apparently got an eye full.

When it comes to salesmanship, an industrialist is no match for a college president. The sales talk probably ran something like this: "Who are these people to object to your leaving a little industrial laboratory to go and head up a great department of chemical engineering in a great University? Besides, you are in the stigmatized alcohol business, bed-ridden by a large number of outlawed relatives. Look at what Bishop Cannon, Wayne B. Wheeler, and Congressman Volsted think about alcohol and all the people in that industry! Come on out into the great open spaces where you can get away from these illegal fumes, and loiter in the academic shade trees. Besides you have covered both the Atlantic and the Pacific ends of the country, but passed up the promised land of the Mississippi Valley."

Keyes left us, and moved on to become a full-fledged college professor in a great university. He had our best wishes and our full confidence that he would do a master job for the department and the profession of chemical engineering.

The job at the university of Illinois was about the toughest one Keyes had ever tackled up to that time. It is a matter of history what he did in seventeen years to the Department of Chemical Engineering. His graduates are now well scattered throughout industry, and from what I have seen they all belong to the class from which vice presidents are made.

The Battles of Washington

Keyes and I have been through three great wars: World War I, Prohibition, and World War II. I enlisted for the Battle of Washington in the first and second of these wars. Keyes took his indoctrination in Washington during the Prohibition Battle, but reserved his full-time service for the problems of Chemical Production, Research, and Development, in the War Production Board in World War II.

When we were threatened with war, from both the Atlantic and the Pacific side of the country, bright young men enlisted in the Battle of Washington to take over the management of industry, and particularly the chemical industry for war. (Production men thought they could serve their country to better advantage by sticking to their jobs and producing.) It soon became apparent, however

that the managers of the complicated job of chemical production should know something about the chemical industry.

After we had the cuffs cut off of our trousers to save wool for the campaign in Africa; the tails cut off of our shirts to save cotton for diapers for the Arabs, and it was proposed to stop the production of razor blades to save steel to build battleships, top men in industry began to take an interest in Washington management.

But the worst was yet to come. Our starry-eyed amateur management of industry broke out with an edict to stop making men's vests and compel everybody, including Phi Beta Kappa key men, to wear double-breasted coats. This unwarranted invasion of scholastic rights panicked the lawyers, doctors, teachers, and preachers, and something had to be done. Conant of Harvard, Compton of M.I.T., Lawrence of Berkeley, and Keyes of Urbana, all rushed to Washington to take over the management of production for war and to stop this nonsense.

During World War I the chemical industry was short of almost everything required to run a war. We had no synthetic ammonia and nitric acids, no synthetic phenol or toluol, no dyestuffs, or pharmaceuticals, no potash, and limited amounts of contact sulphuric acid, methyl alcohol, acetone, and know-how. When Keyes took over his job in Washington, all of the war essentials were being produced. His big headache revolved around a few smaller but more complicated vacuums, such as the production of about a million tons of synthetic rubber from non-existent intermediates, enormous quantities of aviation gasoline, and similar problems.

I was contented to leave the problems of chemical production for World War II to Keyes, but he inveigled me into serving on one of his committees. I served one day. A lot of industrialists were called to Washington to see what could be done about producing more Thiokol to be substituted for rubber. We were told that the synthetic rubber program had bogged down, and that a tremendous quantity of Thiokol was needed to take up the slack. I offered to convert our sulphur black plant to the production of Thiokol, if it were really needed, and somebody would tell us how much they wanted. At that point, I figured that I had time to catch the Congressional Limited back to New York, if fortunate enough to locate a taxicab. As I was cleared by the guard and stepped out of the building, who should drive up and hop out of a cab but Keyes.

He said that this meeting might as well be called off, because, on the basis of the Baruch report, they had located a two-fisted railroad president from Missouri to head the rubber program, and that he was to be as-

sisted by one of the country's most able technologists from Boston, named Bradley Dewey. With this good news, I promptly jumped into the cab and caught my train, feeling that Keyes' Number One problem was as good as solved, and that my work on the Committee was finished.

Keyes Becomes Vice President

It was a foregone conclusion that a man of Keyes' training and experience would not be permitted to go back to loiter in the academic shade trees after he had done his job in Washington. He had impressed many industrialists with the fact that he knew what he was trying to do, and could do it. Someone in the chemical industry was sure to need such a man. Besides, it was about time for my colored boy's prophecy to come true.

As vice president of the large, important, and aggressive Heyden Chemical Company, he has, I think, hit the right spot. He is in step with such policies, and knows how to carry them out. His company will grow some by acquisition, but more particularly through research and developments from within. His faculty for collecting good men, his knowledge of where to find them, his teacher's instinct to develop them, and his intuitive ability to fit them into the right place in his company, is bound result in an energetic, capable and far-reaching organization which can face, meet and beat competition. I think this is just the kind of a job Keyes has been looking for, in spite of his wanderings, I think New York is where he wants to be.

I shall report one instance which illustrates the way Keyes brings an argument to a point, especially his point. A group of about one-hundred directors of research, representing a cross-section of the top chemical industries, held a meeting. The representatives in that group started with vice presidents, and worked on down through presidents and chairmen of boards. Several papers were presented on problems for industrial research. The chairman asked Keyes if he would like to comment on some of these problems. Keyes got up and said, "Yes, I certainly would." He then asked this group of top men in industrial research to direct their talent to helping him to find a place to live in New York! That remark turned the trend of the discussion into the housing shortage for research personnel, not only in New York, but in other parts of the country. Washington was so impressed that they took up the problem and Congress now has several billion-dollar programs directed to spending your tax money in solving it!

In addition to my remarks on his career, you will find many reasons to justify the New York Chapter's selection of Donald B. Keyes for its first Honor Award.

Presentation of Award to Dr. Keyes

President Lawrence H. Flett
The American Institute of Chemists

PRACTICALLY all chemists receive an orthodox undergraduate education which has been standardized and approved by the American Chemical Society. Textbooks are reasonably uniform. After four years, the student is graduated and certified as having absorbed the standard, required amount of chemical knowledge. Some may have a little more in their heads and some a little more in their books.

When these boys and girls have been graduated, their success and their accomplishments in the fields of science and industry vary to an unbelievable degree. One becomes a plodder, a highly skilled pair of hands, and he remains such throughout his career; another develops into a creative genius and builds a great new science or a mighty new chemical industry.

The difference in these men does not rest in their formal education. It arises from a consciousness of professional responsibility. This small light which can lead men to the heights of successful accomplishment is not born with people; it is kindled by great teachers, in and out of universities, such as the man we honor.

The difference in objective between a strictly scientific chemical society and our professional society is: THE AMERICAN INSTITUTE OF CHEMISTS expects its members to do useful work whether it be in the field of basic research, education, chemical engineering, or any other field of the chemical profession.

Chemists become unduly concerned because they feel that their profession does not rate the same standing as other professions, for example, the medical profession. This concern is not well founded on two counts. First, THE AMERICAN INSTITUTE OF CHEMISTS has achieved recognition for the chemical profession. There is no recognition for the doctor who is a failure and there is no recognition for the chemist who is a failure. But there is just as much fame and recognition for a great chemist as there is for a great doctor. So the first problem in raising the average professional status of the chemists is to help our members to be more successful in their work.

Professional Ethics

The second count concerns the professional ethics of chemists. Does the young chemist who envies the achievements of the physician always exercise the same ethics that the physician exercises? Too often the young chemist becomes sidetracked on work

which he finds interesting while the problem which he is hired to solve goes unchallenged. Would he expect the physician to ignore his patient, let him die, while he busied himself with more interesting things about the house? Does the young chemist maintain the same confidence and secrecy concerning his employer's business that he would expect the physician to maintain with respect to his patient?

The answer is that successful chemists do. The chemist who expects to be paid for accomplishment is careful to devote himself to that accomplishment. Useful work can be made just as interesting as useless work.

This is plain common sense, but it is often the most difficult thought to impart to the beginning chemist. There are few people who have the ability to understand success and very few of them are as richly gifted with this ability as is our Honor Recipient. It is difficult to understand just what there is about this quiet, kindly man that so profoundly affects the success of young chemists. I have never worked with him. I feel privileged in my associations with him, but I have no doubt that many a research man has found his own answer to his own problems in the quizzical smile, so deeply etched on our Honor Recipient's face.

The world today is confronted with problems so serious that their solution goes beyond the realm of human knowledge. In our efforts to bring health to everybody, we are extending the average lifetime and rapidly expanding the population. We are moving to an economy where we guarantee security to billions of babies yet unborn. While our population swings up at a staggering rate, the generous gifts of a once bountiful nature are running out. We can begin to see the end of priceless deposits of iron, petroleum, lead, and even fresh water. I do not know how the problems of the future are going to be solved. There is no answer in the archives of scientific research, but I have faith that the younger chemists will meet these problems squarely and successfully in a world which cannot possibly survive without their help.

Influence

The recipient of the first Honor Award of the New York Chapter, A.I.C., stands as one of the greatest influences on these young men. Those who know him have recognized the importance of his influence and of his unwavering devotion to the youth of our profession. No matter how great his personal problems may have been, no matter how hard pressed to find time for a few moments of relaxation, he has never failed to be present where the interests of the beginner were concerned.

Because the INSTITUTE concerns itself with chemists rather than chemistry, we receive many personal communications; among them, recent-

ly, a letter from California discussing a young man gifted with all of the precious genius which the science of chemistry thrives upon, but without that small light, that quintessence which would change him from a technician to a chemist who would make great contributions to the future of America. The letter says, "but when his brains are considered along with his other, more than ample, potentialities, I am sure the boy can well be one more chapter in the saga of what this country once was." What the writer asks is: "that such men as Dr. Keyes take pains to see that the boy has his chance." He closes by saying, "I would like mightly if fate could have a small 'assist' in this case."

It is interesting to us in the New York Chapter who have seen Dr. Keyes' devotion to the younger men to note that the knowledge of this extends across the country. Like curious young girls, we would like to glance through the final pages of the book to know whether this young man will have his "assist" and to know what greatness he will achieve.

There is no cash reward for the effort which our Honor Recipient so generously gives. His reward must be taken in the contribution to science made by all of those boys whose lives he has so profoundly influenced. THE AMERICAN INSTITUTE OF CHEMISTS congratulates the New York Chapter on having set up an award to honor this human kind of contribution to chemistry.

Donald Babcock Keyes, Fellow of THE AMERICAN INSTITUTE OF CHEMISTS, I have been privileged by the New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS to pass to you their first Honor Award. The citation reads, "For his service and devotion to young chemists. His influence and guidance have brought happiness and distinction to those who have had the good fortune to be closely associated with him."

Acceptance

Dr. Donald B. Keyes, F.AI.C., in accepting the Honor Award expressed his deep gratitude, "This award will never be given to one who appreciates it more nor to one who is more grateful." He thanked the Rev. Eugene A. Gisel, S. J., chairman of the Department of Chemistry of Fordham University, for the invocation and prayer with which the meeting was opened. He expressed his appreciation to President Flett and to Dr. Martin Meyer, chairman of the New York Chapter, A.I.C.; to Dr. Whitaker; to his many friends who were present, including Dr. Marston T. Bogert, Hon. A.I.C., and Dr. Charles L. Parsons, Hon. A.I.C.

Then Dr. Keyes informally introduced the friends seated at his table. Concerning each he recounted incidents about their lives. Among these

friends were: Lawrence R. Brown, assistant to the president of Publicker Industries, "the man who, though not a chemist, knows more about the periodic system than most chemists;" Dr. Milton C. Whitaker, "the tycoon who is a chemical engineer;" Dr. Harvey N. Davis, president of Stevens Institute of Technology, "physicist and mechanical engineer who invented a modern chemical engineering course;" Dr. Ralph N. Lulek, vice president of Heyden, "successful organic chemist who got a production job with a solvent concern and in two-and-one-half years reached the top;" George Lewis, of Lewis, Welch and MacDonald, general counsel for Heyden, "the good lawyer;" Simon Askin, vice president of Heyden, "one of our good friends who helped the Arrangements Committee with this meeting;" Paul Van der Stricht, secretary of Heyden, "the good secretary;" Clarence W. Capes, vice president, Bank of Manhattan Company, "the good banker;" Waldo Shumway, dean, Engineering Department, Stevens Institute, "unique embryologist who devised the World War II point system of demobilization;" Barney Armour, president of Heyden, "the business man who started with $243 and built it into an industrial empire—his mottos: Give the public something new that they need and at a price they can afford to pay; No trade is satisfactory unless both parties win;" and David H. Killeffer, F.A.I.C., "a chemist who has an actual contribution to young chemists in his book, *The Genius of Industrial Research.*"

Dr. Donald Price
Re-elected A.I.C. Councilor

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The Distribution of Chemicals and Chemical Specialties

R. F. Revson, F.A.I.C.

Chemist, R. F. Revson Company, 243 West 17th Street, New York 11, N. Y.

(This is the fifth of a series of papers prepared by members of, and reviewed before publication by, the Member Advisory Committee, New York Chapter, A.I.C.)

THE distribution of chemicals and chemical specialties is made by:

(1) Manufacturers to all levels dependent on quantity.

(2) Distributors, brokers and jobbers in manufacturer's original packages only.

(3) Wholesalers to retailers and small manufacturers.

(4) Retailers and canvassers direct to ultimate consumers.

(5) Exporters—varies considerably with packing requirements.

We will attempt to illustrate the types of materials and suggest their normal distribution channels. If you have something that is "super," something that is different and catches the public's fancy, all traditions may be set aside and nearly every custom may be violated and still be successful.

It is assumed that you want to go into business; that preliminary surveys have been made covering the active and potential demand and that portion of it that you can supply; that you know your costs of doing business, sources of supply of raw materials, etc., and that all of the factors involved, including finance, have been satisfactorily overcome or provided for.

Distribution is really one phase of marketing, which is being covered adequately in another paper. In a broader sense it is the course taken by merchandise from the manufacturer to the consumer. Since chemical merchandise varies so greatly by reason of value, bulk, site of manufacture, etc., the method of distribution will depend upon the nature of the chemical to be distributed, the nature of the consuming market as well as the point at which it is initially available. Therefore, the first thing to be asked is, "What do you wish to distribute?"

We shall assume that it is a business which would require not more than $10,000 to $20,000 capital. Within this range could well come the manufacture of chemical specialties and minor chemicals, as well as distribution as jobber, wholesaler, retailer, and exporter of chemicals prepared by others.

If we assume the above figures for most of our reasoning, then the manufacturing end is further narrowed to

virtually simple mixing or processing involving a minimum amount of labor and apparatus. For example, it might mean the manufacture of a spot remover consisting of carbon tetrachloride and benzene. This might be mixed by the newcomer or indeed purchased already mixed. He would bottle, label under his own trade mark, and market through the customary channels for such a product, or find some new methods of distribution. It might mean the mixing of certain alkalies such as soda ash, trisodium phosphate, borax, etc., into a cleaning compound, requiring merely some mixing and filling devices. While these two illustrations represent possibly highly competitive fields, new unsuspected markets may be developed.

We might assume also that a market (limited) existed for, say, myricyl alcohol. The market perhaps is not large enough to attract the attention of big factors. With limited apparatus, sufficient material could possibly be marketed at profitable prices.

Distribution of Specialties

Assuming that you have chosen a chemical specialty, how do you distribute it? Here again we have to assume that you have established the fact that the market exists and that you know where it is. In the case of the cleaning fluid, several methods of distribution are possible, all of which more or less preclude the others. The chain stores purchase directly. Distribution might be made directly to each store, or a large number of cases or cartons might be shipped to one of their distribution centers or warehouses.

The wholesaler will distribute for you to the retailer, but not if you sell to the retailer direct. The retailer is also unlikely to handle your goods, if you should choose to sell to the ultimate consumer directly such as through canvassers. The customary discount to the wholesaler on such a specialty might be 50 per cent; to the retailer, 33 1/3 to 40 per cent; to the canvasser, about 40 per cent. Assuming that the article sells, the wholesaler will give you greater volume and less credit risk than the retailer. The canvasser under the same conditions will show little or no credit risk but a great deal of detail work in correspondence, records, individual shipments, etc. If the proposition requires large expenditures in advertising before the wholesaler or chain stores will handle it, then the canvasser method is better, since sales to the consumer are built on the goodwill that the solicitor has attained in his relationships to his customers. Upon his recommendation his customer will "try anything once."

We might here mention that canvassers differ from salesmen in several respects: (1) They sell directly to the final consumer; (2) They generally carry merchandise with them and make delivery on sale of

goods or on subsequent call; (3) They may purchase goods from the source and sell for their own accounts, or (4) They may sell consigned goods. Their compensation is usually a discount from the list. When selling consigned goods, they remit only the costs to the source and pocket the balance as profit. Where delivery is made at the time of sale, some communities require the canvasser to take out a license. The canvasser's field of operation is generally rural or suburban.

The salesman on the contrary (1) Sells at all levels; (2) makes no deliveries; (3) Carries no accounts for himself, and (4) is compensated by salary or commission or both.

Canvassers are obtained generally by advertising or by purchase of lists from listing companies within the territory desired.

In general it might also be said that anything that can be sold by salesmen or canvassers may likewise be sold by mail. Success in this method requires: (1) A good list of prospects (which may be obtained from (a) telephone directories, (b) commercial advertisements, (c) listing companies; (2) A good presentation of the item to be sold. This should include its properties, application, availability, packing, and if possible, price. Such solicitation should be attractive, dignified, free from exaggerations and false claims. The service of a professional copy writer is frequently worth the added costs. It is false economy to use "cheap" stationery.

The alkali cleaning compound is sold in large consumer units. (We are purposely omitting the small package item, because of the large amount of capital needed for development of the package, high-speed filling machinery, advertising, etc.) Here the country route canvasser is unlikely to be of assistance. He cannot afford to carry 100-pound bags or 250-pound barrels with him. The wholesaler of janitor and building maintenance supplies can market directly. The retailer of such items, in the sense of grocery and drug stores, does not exist. If sufficient funds are available for advertising purposes, it can be sold directly to the consumer such as farms, dairies, buildings, particularly those not in the highly populated urban areas. Preferably, delivered price should be given for all areas or within some areas, such as Long Island, Westchester County, etc. To certain types of consumers the terms can be remittance with order, thus conserving paper work and retaining liquid capital.

In the third type of specialty, (myricyl alcohol), it must be assumed that enough search has been made to ascertain a sufficient market justifying at least initial production in an amount that will bring in returns. Suppose it has been found that the cosmetic, plastics, and pharmaceutical

industries have shown encouraging interest. Wholesalers in the usual sense will not touch it; exclusive distributors might but the retail, mail order, and canvasser field do not exist for an item of this type. Because initial costs are likely to be high (due to distribution of overhead over small production), sales are preferably made directly to consumers. If it is a new chemical or a chemical rarity, made available for the first time in some volume, scores of concerns will be interested in trial lots. Chemical periodicals will give you space, gratis, for the announcements. Small inexpensive advertisements placed in suitable magazines will bring inquiries. Samples should either be distributed gratis or in single pound lots at a unit price made for the convenience of those who would like to try it out. An exclusive distributor who already has an entry in the field of its potential use is possibly the quickest channel of introduction. You must be prepared, however, to give the distributor about 20 per cent for such service. Bear in mind, that the exclusive distributor is not going to invest in stock until an actual market has been developed for the product.

Non-Specialties

If your product is not a specialty, then, likely, you enter a competitive field. If you purchase in bulk and repackage, you may sell through all of the regular channels of trade handling such small units. Now these small units may be bought by the trade at all levels. Assuming you were repackaging, say, Mono-Sodium Glutamate, which is used as a flavor (meat), if you wish, you could advertise and sell directly by mail to the ultimate consumer. The packages would be put up for distribution through the wholesale-retail-consumer chain. You may also find manufacturers whose requirements are insufficient to justify purchase of manufacturers' unit packages and who will gladly pay you a profit for selling them, say, in 10-pound lots. When the product is better known, the canvasser system might also serve.

However, the bulk of the chemical trade is made up of more prosaic items, such as sulphuric acid, chloride of lime, zinc oxide, etc., all of which are sold in bulk quantities directly by the manufacturer to consumer. Some of these items are very expensive to repackage, but a market exists for small quantities. The small quantity prices might well be three to ten times the manufacturer's original prices and still yield but little to the repacker. Hazardous chemicals are best sold in original containers only; the margin is apt to be small but, occasionally, deliveries will be made by manufacturers directly for your account. Otherwise the repacked units are sold for the most part directly to consumers who may be using them for small scale manufacture themselves. For example, certain industries or

factors purchase USP Glycerine in less than 5-gallon lots. Many small users of dyestuffs buy even less than a pound of dye at a time. Chemical laboratories purchase not only C.P. but industrial chemicals in small lots; the same being true of educational institutions.

Export Distribution

Whether you are preparing specialties or selling standard or repackaged merchandise the export field is still available to you. In export one sells (1) either directly to the exporter and delivers the goods for his account to the local dock or freight station, or (2) ships goods directly for his own account to the foreign consignee. Selling directly to the exporter is practically the same as any other domestic sale, except that the goods generally must be packed more securely, and instructions of the exporter regarding marks, delivery, etc., taken into account. The exporter is given a discount usually of 2 to 5 per cent; the bills being payable generally after delivery to the dock or as is termed, "Against presentation of invoice with dock receipt." Export direct involves an intermediary; a forwarding agent to make up the proper papers, etc. Terms today are the most important phase of this business. Normally, good concerns all over the world purchase most items against sight draft with shipping documents. Today the dollar shortage makes the collections of such funds slow and the sales through the exporter would seem wiser for the novice.

It should be obvious that the small man is not going to be able to compete in heavy chemicals or those chemicals which are highly competitive in substantial quantities since manufacturers are happy to sell direct. However, where the foreign buyer wants a variety of items all of which are not furnished by a single factory, then the exporter or the repacker comes into his own. It is quite possible to pack scores of small packages of various chemicals and to pack them advantageously for export simply because many of the manufacturers simply can't or won't do it. The regular established exporter rarely has any packaging facilities and must get you or others to do it for him.

Summarizing: Know what you are selling, its uses and properties. Have something to sell that is wanted (or needed) by a sufficient number of people and that can be sold at prices that compete in the market, or which provides a service that is unique, and above all, at the same time, yields a fair profit. If you can do this, success is probable, if you can stick it out long enough.

Laboratory Space Wanted

Chemists who have laboratory space for rent in or near New York, N.Y., please write to Box 710, THE CHEMIST.

Plan For Getting a Position

H. Bennett, F.A.I.C.

(Prepared by members of, and reviewed before publication by, the Member Advisory Committee of the New York Chapter, A.I.C.)

1. Determine that position for which you are best suited—not necessarily the one that you would like to get.
2. Prepare a personal data sheet (typewritten; double spaced) with a good photograph. Use the A.C.S. Employment form if possible. When in final form, make 100-200 multigraphed, neat copies.
3. Register with the A.C.S. Regional Employment Clearing House at 60 East 42nd Street, New York, N.Y., or at bureau nearest to your home.
4. Register with the private technical employment bureaus near your home or business.
5. Call on or write to your school for employment inquiries that may come to them from time to time.
6. Read the "Want ads" in the large city newspapers, scientific journals, and trade papers.
7. Insert your "ad" in these publications. Make sure that it is concise and well written.
8. Write to those concerns that you feel could use a man of your type.
9. Call upon those concerns that you feel could use a man of your type.
10. Attend all technical and scientific society meetings. Discuss your needs with those you know. Get introductions or introduce yourself to strangers and tactfully sound them out as to possible employment opportunities.
11. Examine the lists of Government openings, Federal, State, and City.
12. Call on or write to consultants who have temporary or permanent openings periodically.
13. Scholarship and experience alone do not necessarily qualify you for a position. Personality, appearance, and ability to get along with others are important. Get someone to criticize these qualities in you. Try to improve any shortcomings. If this is impossible, you will find it difficult to obtain employment.

It may take a few months to get placed. If you cannot wait too long a time, you might consider the following fields where your technical background may be helpful:

A. Teaching
B. Technical Sales and Service
C. Technical Market Service and Analysis

To leave the chemical field may also be indicated. While you may not like this, you should consider it. Your education and technical experience need not be a handicap. They should be a help. Consider the many without technical training who have succeeded in business.

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James R. Withrow, *At-Large*
Lincoln T. Work, *At-Large*

June Meeting

The 258th meeting of the National Council, A.I.C., was held June 8, 1949, at 6:00 p.m., at The Chemists' Club, 52 East 41st Street, New York, N.Y. President Lawrence H. Flett presided.

The following councilors and officers were present: L. H. Flett, K. M. Herstein, F. A. Hessel, C. P. Neidig, E. H. Northey, D. Price, C. W. Rivise, H. Robinette, F. D. Snell, and L. Van Doren. J. R. Minevitch and V. F. Kimball were present.

The minutes of the preceding meeting were approved.

President Flett spoke of the In-

stitute's ability to encourage and assist in matters of education. He asked the councilors to consider the recognition of those who teach chemistry by setting up a special award limited to the field of education. Dr. Price pointed out that the teaching profession is usually unfortunate financially, and that it should at least receive special recognition and social prestige.

President Flett reported that he had presented the award of Honorary A.I.C. membership to Dr. E. R. Weidlein, F.A.I.C., at a dinner meeting of the Pennsylvania Chapter, and that Dr. Weidlein's lively address was much appreciated by those who attended.

Among the communications which President Flett received was one from a chemist who suggested that the A. I.C. undertake activity to encourage the employment of chemists over forty years of age.

The Secretary reported that we now have 2,425 members in the INSTITUTE.

Resolutions prepared by Dr. Walter J. Murphy, F.A.I.C., for the late Dr. Willard H. Dow were presented and accepted. (See June CHEMIST, page 237.)

Dr. Northey reported that a legislative attack had been made on the clinical chemists in Connecticut.

Mr. Neidig moved that the thanks of the Council be given to the Councilors who retired from the Council this year.

The following new members were elected:

FELLOWS

Adkins, Homer
Professor of Chemistry, 369 Chemistry Building, University of Wisconsin, Madison 6, Wisconsin.

Hable, George J.
Chief Control Chemist, S. C. Johnson & Son, Inc., 1525 Howe Street, Racine, Wisconsin.

Horwill, Benjamin N.
Research Chemist, Arco Company, 7301 Bessemer Avenue, Cleveland 4, Ohio.

Montaque, Latane Gordon
Assistant Technical Director — Vehicles Trade, Devoe & Reynolds Company, Inc. Louisville, Ky.

Pollard, Charles Phillips
Partner, Patent Attorney, Hammond and Littell, 11 West 42nd Street, New York 18, New York.

Ricci, John Ettore,
Professor of Chemistry, New York University, University Heights, Bronx, New York.

Sumerford, Worden Taylor
Chemist, in charge, U.S. Public Health Service, Savannah, Georgia.

Walker, Albert Charles
Chemical Engineer, Bell Telephone Laboratories, Murray Hill New Jersey.

Waring, Gerald Worden
Engineer, Shell Development Company, 100 Bush Street, San Francisco 9, California.

Weiland, Henry Jacob
Chemist, Cincinnati Chemical Works, Evanston Station, Cincinnati 7, Ohio.

Willson, Karl Stuart
Group Leader, Electroplating Research, 3785 West 33 Street, Cleveland 9, Ohio.

Woodbridge, Richard George, 3rd
Chemical Adviser, New York Life Insurance Company, 51 Madison Avenue, New York 10, N.Y.

Wright, Paul McCoy
Professor of Chemistry, Wheaton College, Wheaton, Illinois.

Young, David Wilson
Senior Research Chemist, Standard Oil Development Company, Esso Research Center, Linden, New Jersey.

MEMBER

Jones, George Raymond
Partner, Beale and Jones, 1411 Pennsylvania Avenue, N. W., Washington 4, D.C.

RAISED FROM MEMBER TO FELLOW

Clendenin, William Herman
Chief Chemist, Distillation Plant, Darling and Company, Chicago 9, Illinois.

There being no further business, adjournment was taken.

Local Chapter News

C. P. Neidig, F.A.I.C.

Chicago

The Chicago Chapter met on the evening of June third to honor Dr. Gustav Egloff, twice president of the A.I.C., and to present him with Honorary Membership in THE AMERICAN INSTITUTE OF CHEMISTS. The presentation was made by Dr. Johan Bjorksten, chairman of the Chicago Chapter. Following the presentation, Dr. Egloff addressed the Chapter on the subject of: "The Role of the A.I.C. in Educating Chemists." (This paper will appear in an early issue of THE CHEMIST.)

The discussion period centered around the theme of the A.I.C. aims. Comments were made that some of the Chapters of the A.I.C. are presenting speakers on technical subjects rather than adhering to A.I.C. aims and presenting subjects concerned with the chemist himself. An exchange of interesting speakers between chapters was suggested to prevent a chapter from becoming too self-centered.

The yearly business meeting and election of officers followed. Incoming chairman, Dr. Herman S. Bloch, took the gavel from Dr. Bjorksten and the meeting was adjourned.

Officers for the coming year are:

Chairman, Dr. Herman S. Bloch
Chairman Elect, Bruce M. Bare
Vice Chairman,
Dr. W. B. Hendrey
Secretary-Treasurer,
Dr. Louis Koenig
Representative to National Council, Gene Abson
Chapter Councilors (3 years)
Clifford A. Hampel, Dr. Vanderveer Voorhees, Dr. Gustav Egloff
Chapter Councilor (1 year)
G. T. Tobiasson

Student Medals, awarded to outstanding students in the Chicago Chapter area, were presented in May to:

Constantine Katsaros,
Illinois Institute of Technology
Lowell C. Bahe,
Purdue University
Robert Bruce Mosely,
University of Chicago
John D. McCollum,
University of Illinois
James E. Kruger,
University of Wisconsin
Leonard C. Grotz,
Northwestern University
Albert W. Burgstahler,
University of Notre Dame

Louisiana

A meeting was held, June 10th, at the home of the chairman of the program committee, H. A. Levey. A number of subjects were discussed, including the possibility of awarding a certificate of merit for outstanding service to the profession of chemistry. Talks are to be arranged for the assistance and guidance of young chemists. The question of licensing was discussed and it was reported that a bill to license engineers had again been vetoed by the legislature.

It was announced that H. P. Newton, F.A.I.C., of the Southern Regional Research Laboratory in New Orleans, has been promoted to the rank of Brigadier General in the Reserve Corps.

Following adjournment of the formal meeting, the members and their wives were guests of Mr. and Mrs. Levey at a buffet supper.

Los Angeles

Annual Report 1948-1949

THIS past year has been marked by a vigorous growth. Sixteen new memberships have come in since October, 1948.

In accordance with our suggested policy, we are going to the younger chemists and inviting them to join with us. This policy has yielded the desired results.

Two general meetings have been held with good attendance. Our executive council has met and planned a series of meetings to be held at the various institutions training chemists for the purpose of bringing a professional program to them at the student level. Two very successful meet-

ings have been held by the Chairman with excellent results, and more are planned for the future.

Our Chapter has joined with the local Technical Societies Council, an organization whose objective is active cooperation on common interests.

The Los Angeles Chapter has proposed to the National Office the formation of a chapter in the San Francisco area which would integrate our northern colleagues who, unfortunately, are not able to meet with us.

A present professional activity is a joint action with the Southern California section of the American Chemical Society regarding proposed licensing of Analytical Toxicologists by the State Board of Pharmacy.

Our Chapter looks forward to continued growth and service to the chemists of Southern California.

—Manuel Tubis, *Chairman*

Pennsylvania

The Pennsylvania Chapter met June second to present Dr. E. R. Weidlein, F.A.I.C., director of the Mellon Institute for Industrial Research, with Honorary Membership in THE AMERICAN INSTITUTE OF CHEMISTS. The presentation was made by Lawrence H. Flett, President, A.I.C. In his acceptance speech, Dr. Weidlein traced many of the technical developments which originated at Mellon Institute and placed particular emphasis on the simultaneous development of the profession of chemistry. Many of the men associated with the early work at Mellon Institute hold responsible positions in the chemical industry today.

The following officers were elected for the coming year:

Chairman, Hillary Robinette, Jr.
Vice Chairman, C. P. Neidig
Secretary - Treasurer, John Staub
Representative to National Council, Charles Rivise

New York

The membership of the New York Chapter returned to office for the 1949-50 year the entire present staff of officers who directed so well the Chapter affairs during the past year. These officers are:

Chairman, Dr. Martin Meyer
Vice Chairman, Dr. Lincoln T. Work
Secretary-Treasurer, Dr. Maurice J. Kelley
Representative to National Council, Karl Herstein.
Chapter Councilors, Dr. Walter J. Baeza and G. A. Kirton

Plans for six dinner or discussion meetings for the coming year have been approved so far as possible. Detailed plans for the meetings are being worked out under the direction of Dr. Robert Ginell, chairman of the Program Committee. At the council meeting, June 9th, a number of suggested topics for each of these meetings was discussed, and we look forward to an excellent series of pro-

Dr. R. H. Kienle
Re-elected A.I.C. Councilor

C. P. Neidig
Re-elected A.I.C. Councilor

grams. Scheduled dates for these meetings are:

October 6, 1949
November 16, 1949
January 5, 1950
February 5, 1950
April 26, 1950
May 24, 1950

At the meeting on May 18th, the New York Chapter awarded the following Student Medals to outstanding students:

William F. Biller,
Rutgers University

George J. Distefano,
Fordham University

Martin Goldman,
Polytechnic Institute of Brooklyn

Richard L. Hinman,
Columbia University

Sidney Langer,
New York University (Washington Square)

Amos Leffler, *Brooklyn College*

Alfred Linker,
City College of New York

Peter L. Martese, *Queens College*

Edward Trachtenberg,
New York University (University Heights)

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File of the Chemist Offered

Professor Burleigh Reed, F.A.I.C., offers a complete file of THE CHEMIST, from 1942 to the present, to a library or well established organization that needs it. There is no charge except for packing and transportation.

Prof. Reed's address is, Department of Chemistry, Washburn Municipal University, Topeka, Kansas.

National Council Meeting

The National Council, A.I.C., will meet July 13, 1949, at the Chemists' Club New York, N. Y.

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